PowerEdge M420

Technical Guide

The PowerEdge M420 is a 2-socket, quarter-height blade server with 32 individually serviceable blade servers delivering unprecedented computational density.

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Table of contents

1 System overview 5
Introduction 5
New technologies 6
2 System features 7
Comparison of PowerEdge systems 7
Specifications 8
3 Module views and features 11
Module views 11
Module features 14
4 Processors 16
Processor features 16
Supported processors 17
Chipset 17
5 Memory 18
Supported memory 18
Memory configurations 19
Memory speed 19
Memory RAS features 20
6 Storage 21
Internal storage 21
Storage controllers 21
7 Networking and mezzanine cards 23
System management integration 23
Expansion connectors 23
Mezzanine cards 23
Interconnectivity matrix 24
8 Power, thermal, and acoustics 27
Power consumption and energy efficiency 27
Power supply units 28
Thermal and acoustics 28
9 Operating systems and virtualization 30
Supported operating systems 30
Supported virtualization 31
10 Dell OpenManage systems management 32
Systems management solutions 32
OpenManage systems management 33
Dell server management operations 37
Appendix A. Additional specifications 40
Module dimensions and weight 40
Environmental specifications 40
Video specifications 41
USB peripherals 41
Appendix B. Standards compliance 42
Appendix C. Additional resources 43

Tables

Table 1. New technologies 6
Table 2. Comparison of PowerEdge M420, M520, and M620 7
Table 3. Technical specifications 8
Table 4. Module features 14
Table 5. Supported processors 17
Table 6. Memory technologies supported 18
Table 7. DIMMs supported 19
Table 8. Memory speed capabilities 20
Table 9. Memory RAS features 20
Table 10. Hard-drive backplane option 21
Table 11. Supported drives 21
Table 12. RAID controller feature support 22
Table 13. Supported mezzanine cards 23
Table 14. Power tools and technologies 27
Table 15. M420 acoustical performance 29
Table 16. Primary operating system support 30
Table 17. Virtual guest operating system support 30
Table 18. Virtualization support 31
Table 19. iDRAC7 with Lifecycle Controller functions and benefits 33
Table 20. Feature comparison for iDRAC7 Enterprise and iDRAC7 Express for Blades 34
Table 21. One-to-one and one-to-many operations 38
Table 22. Environmental specifications 40
Table 23. Supported video modes 41
Table 24. Industry standard documents 42
Table 25. Additional resources 43

Figures

Figure 1. M420 front view 11
Figure 2. M420 sleeve containing four blades 12
Figure 3. M1000e chassis enclosure with 32 M420 blades 13
Figure 4. M420 internal module view 13
Figure 5. QRL code located on module 14
Figure 6. M420 connectivity matrix for 32 blades 25
Figure 7. Fabric interconnectivity examples 26
Figure 8. Dell systems management solutions 32
Figure 9. Systems management server lifecycle 38
Figure 10. Module dimensions 40

1 System overview

Introduction

Enjoy remarkable computational density with the Dell™ PowerEdge™ M420 that can deploy up to 32 server nodes in just 10U of rack space. Scaling up to 16 processor cores and 192 GB of RAM, each M420 couples processing power and memory capacity with tremendous I/O throughput, with up to two ports of 10Gb Ethernet available in an exceptionally compact, individually serviceable form factor. From entry and mid-tier business applications, to high node-count virtual environments, and even distributed workloads such as cloud or high performance computing (HPC) environments, the M420 provides advantages for virtually any data center where a large number of computational nodes need to be deployed in minimal space.

Ensure business continuity

Dell's no-compromise approach towards enterprise-class features on our M-series blade servers is not limited by the M420's ultra-dense form-factor. The fully redundant and individually serviceable M420 platform offers such capabilities as hardware RAID and hot-pluggable dual solid-state drives in order to ensure maximum uptime. Dell's unique failsafe virtualization technology even extends the redundancy and resiliency of the M420 to virtual environments, offering a redundant, failover-capable infrastructure for embedded hypervisors.

Improve operational efficiency

Help manage your servers using the Dell OpenManage™ portfolio, including Dell's exclusive Integrated Dell Remote Access Controller 7 (iDRAC7) with Lifecycle Controller. iDRAC7, an embedded systems management feature, allows Dell servers to be managed in physical, virtual, local and remote environments, either in-band or out-of-band and with or without a systems management software agent. OpenManage also integrates and connects to leading third-party systems management solutions you may already use, allowing you to maintain a single point of control and capitalize on your existing investment. OpenManage simplifies the lifecycle of deploying, updating, monitoring, and maintaining your PowerEdge servers.

The PowerEdge M-series blade server line

Implement the right combination of features and performance scalability with the PowerEdge M-series blade servers, which can handle tough workloads in any size data centers. In addition to the world-class management features provided in all PowerEdge servers, the M420 also takes advantage of the capabilities of the M1000e Chassis Management Controller (CMC). The CMC allows M-series blades to be managed individually or as groups, in single or multiple chassis, and within a data center or in multiple geographically dispersed locations around the globe without requiring a single agent or additional hardware. In addition to the existing networking infrastructure, the new Dell Force10 MXL 10Gb switch provides next-generation port density and bandwidth for exceptional throughput. PowerEdge M-series blade servers use the redundant power and cooling infrastructure provided by the Dell M1000e blade enclosure, which is exceptionally easy to deploy and manage, and maximizes power and cooling efficiency.

New technologies

A number of new technologies are featured on the PowerEdge M420 system, as detailed in Table 1.

Table 1. New technologies

New technologies	Detailed descriptions
Intel® Xeon® processor E5-2400 product family	This new family of Intel processors has embedded PCI Express® (PCIe) lanes for improved I/O performance and additional new features. See the Processors section for details.
Intel C600 series chipset	The Intel Platform Controller Hub (PCH) chip is implemented on the M420.
Next-generation PERC H310	The M420 supports the new Dell PERC H310 controller card with improved functionality and faster performance. See the Storage section for details.
iDRAC7 with Lifecycle Controller	The new embedded system management solution for Dell servers features hardware and firmware inventory and alerting, in-depth memory alerting, faster performance, a dedicated gigabit port and many more features. See the Systems management section for details.
Advanced power management	The M420 supports advanced power monitoring and power capping tools that can help manage power consumption in the data center.
Failsafe hypervisors	The internal dual SD module enables Dell's unique Failsafe Virtualization architecture, ensuring uptime by providing failover capability for embedded hypervisors, such as VMware® ESXi™.
Fresh Air cooling	Dell has tested and validated an integrated data center solution that enables you to operate at higher temperatures or even chiller-less. See the Power, thermal, and acoustics section for details.

2 System features

Compared to the previous generation of Dell PowerEdge blade servers, the M420 has similar memory scalability, as well as more processor cores in a much denser form factor than ever before. Features include DDR3 memory, PCIe 3.0, dual internal SD module, and Dell's next-generation iDRAC solution known as iDRAC7 Enterprise with Lifecycle Controller.

Comparison of PowerEdge systems

The PowerEdge M420 is a 2-socket, quarter-height blade server that delivers an extraordinary balance of value and performance for mainstream business applications, with no compromise on enterprise-class features.

- Designed for exceptionally dense computational environments where space is at an absolute premium. Best fit for space and/or power conscious, highly available, ultra dense nodes.
- Housed within the PowerEdge M1000e chassis with up to 32 independent, individually serviceable, M420 blade servers, offering a unique combination of performance, density, and efficiency.
- Compared with half-height blades:
  - Double the density
  - Half the infrastructure costs (chassis and switches)
  - Reduced cabling to top-of-rack (ToR) switches
  - All with no enterprise feature trade-offs

Three PowerEdge 12th generation servers, the M420, M520, and M620 systems, are compared in Table 2. For the latest information on supported features, visit Dell.com.

Table 2. Comparison of PowerEdge M420, M520, and M620

Feature	PowerEdge M420	PowerEdge M520	PowerEdge M620
Chassis; enclosure	Ultra-dense, quarter-height blade; PowerEdge M1000e Blade Enclosure	General purpose, half-height blade; PowerEdge M1000e Blade Enclosure	General purpose, half-height blade; PowerEdge M1000e Blade Enclosure
Processors	Intel Xeon processor E5-2400 product family	Intel Xeon processors E5-2400 product family	Intel Xeon processors E5-2600 product family
Internal interconnect	Intel QuickPath Interconnect	Intel QuickPath Interconnect	Intel QuickPath Interconnect
Memory	6 x DDR3 RDIMMs	12 x DDR3 RDIMMs and UDIMMs	24 x DDR3 RDIMMs, UDIMMs, and LRDIMMs
Hard drive bays (hot plug)	2 x 1.8"	2 x 2.5"	2 x 2.5"
Embedded NIC	2 x 10GbE Dual Port LOM	4 x 1GbE Dual Port LOM	Dual Port Select Network Adapter, 3 options of 2 x 10GbE
RAID	H310	S110, H310, H710, H710P	S110, H310, H710, H710P

Feature	PowerEdge M420	PowerEdge M520	PowerEdge M620
Express Flash drives	Not supported	Not supported	Up to 2
Mezzanine slots	1 x PCIe 3.0 x8 mezzanine card slots	2 PCIe 3.0 x8 mezzanine card slots	2 PCIe 3.0 x8 mezzanine card slots
Optional SD port	2 x Internal SD slots (2 for redundant hypervisor or 1 for vFlash)	3 x Internal SD slots (2 for redundant hypervisor and 1 for vFlash)	3 x Internal SD slots (2 for redundant hypervisor and 1 for vFlash)
Dell OpenManage Systems Management (Agent-free or with OpenManage Server Administrator [OMSA] Agent)	• OpenManage Essentials • Dell Management Console • IT Assistant • OMSA Agent • OpenManage Power Center (requires iDRAC7 Enterprise with Lifecycle Controller) • Chassis Management Controller 4.x (available with the M1000e Modular Blade Enclosure) • OpenManage Integrations and Connections • iDRAC7 Express for Blades with Lifecycle Controller (standard option) • Trial evaluation available for IDRAC7 Enterprise with Lifecycle Controller	• OpenManage Essentials • Dell Management Console • IT Assistant • OMSA Agent • OpenManage Power Center (requires iDRAC7 Enterprise with Lifecycle Controller) • Chassis Management Controller 4.x (available with the M1000e Modular Blade Enclosure) • OpenManage Integrations and Connections • iDRAC7 Express for Blades with Lifecycle Controller (standard option) • Trial evaluation available for IDRAC7 Enterprise with Lifecycle Controller	• OpenManage Essentials • Dell Management Console • IT Assistant • OMSA Agent • OpenManage Power Center (requires iDRAC7 Enterprise with Lifecycle Controller) • Chassis Management Controller 4.x (available with the M1000e Modular Blade Enclosure) • OpenManage Integrations and Connections • iDRAC7 Express for Blades with Lifecycle Controller (standard option) • Trial evaluation available for IDRAC7 Enterprise with Lifecycle Controller

Specifications

Table 3 lists the technical specifications for the PowerEdge M420 blade server. For the latest information on supported features, visit Dell.com.

Table 3. Technical specifications

Feature	Technical specification
Form factor; enclosure	Quarter-height blade; Dell PowerEdge M1000e Blade Enclosure
Processors	Intel Xeon processor E5-2400 product family
Internal interconnect	Intel QuickPath Interconnect (QPI): 6.4 GT/s; 7.2 GT/s; 8.0 GT/s
Cache	2.5MB per core; core options: 4, 6, 8
Memory[1]	Up to 192GB[1] (6 DIMM slots): 2GB/4GB/8GB/16GB/32GB DDR3 up to 1600MT/s
Chipset	Intel C600
Video	Integrated Matrox® G200
Primary storage	**Hot-plug hard drive options**: Up to two 1.8" uSATA SSD drives (50GB and 200GB)

Feature	Technical specification
	External storage: For information about Dell external storage options, visit Dell.com/Storage
USB ports	2 front
NIC/LOM	Embedded Broadcom® 57810S-k 2P 10Gb
I/O mezzanine card options	**1Gb/10Gb Adapters:** Broadcom 5719 Serdes 4P 1Gb Intel I350 Serdes 4P 1Gb Broadcom 57810S-k 2P 10Gb Intel X520 – x/k 2P 10Gb Qlogic® QME8262-k 2P 10Gb Brocade® BR1741M-k 2P 10Gb **Infiniband:** Mellanox® FDR10 CX-3 40Gb **Fibre Channel:** QLogic QME2572 2P 8Gb Emulex® LPe1205-M 2P 8Gb
I/O slots	One PCIe 3.0 x8 fully populated mezzanine card slot and switch modules yields 2 redundant I/O fabrics per blade
RAID controller	**Internal controller:** PERC H310 embedded
Power supplies and fans	Supplied by M1000e blade enclosure
Dell OpenManage Systems Management (Agent-free or with OpenManage Server Administrator [OMSA] Agent)	• OpenManage Essentials • Dell Management Console • IT Assistant • OMSA Agent • OpenManage Power Center (requires iDRAC7 Enterprise with Lifecycle Controller) • Chassis Management Controller 4.x (available with the M1000e Modular Blade Enclosure) • OpenManage Integrations and Connections: – OpenManage Integration Suite for Microsoft® System Center – Dell Management Plug-in for VMware® vCenter™ – Connections for HP® Operations Manager, IBM® Tivoli® Netcool® and CA Network and Systems Management • iDRAC7 Express for Blades with Lifecycle Controller (standard option) – Upgrade to iDRAC7 Enterprise with Lifecycle Controller – Upgrade to 8GB vFlash media or 16GB vFlash media for iDRAC7 Enterprise with Lifecycle Controller – Trial evaluation available for IDRAC7 Enterprise with Lifecycle Controller

Feature	Technical specification
Operating systems	Microsoft Windows Server® 2008 R2 SP1, x64 (includes Hyper-V™ v2) SUSE® Linux® Enterprise Server Red Hat® Enterprise Linux® **Virtualization options:** Citrix® XenServer™ VMware vSphere™ Red Hat Enterprise Vitualization® For more information on the specific versions and additions, visit Dell.com/OSsupport.
Embedded hypervisor	Two internal SD cards dedicated for hypervisor Or one SD card dedicated for vFlash media support
For more information about the Dell blade solution, see the PowerEdge M1000e Technical Guide or the M1000e Blade Chassis Specification Sheet on Dell.com.	

[1]GB means 1 billion bytes and TB equals 1 trillion bytes; actual capacity varies with preloaded material and operating environment and will be less

3 Module views and features

The Dell PowerEdge M420 implements a new module design, with a quarter-height blade server that requires an M1000e chassis to operate. It occupies one slot vertically in the M1000e rack chassis, which is populated with a sleeve and contains four blades. The M1000e chassis can contain a maximum of 32 blades with eight sleeves. It can be mixed with other existing Dell blades of half-height or full-height form factors and designed to mix with possible future half-height-double-wide and full-height-double-wide blades.

The following sections provide external and internal views of the system and describe the module features. For more detailed information on features and descriptions for the M420, see the *Dell PowerEdge M420 Systems Owner's Manual* on Support.Dell.com/Manuals.

Module views

As shown in Figure 1, the M420 module supports up to two unique front-accessible, hot-plug solid state drives (SSD) and two USB ports.

Figure 1. M420 front view

The M420 is optimized for a densely populated chassis with effective and efficient cooling. Figure 3 shows one of eight sleeves containing four stackable blades in a fully loaded M1000e enclosure.

Figure 2. M420 sleeve containing four blades

The chassis design of the M420 is optimized for easy access to components and for airflow for effective and efficient cooling. Figure 3 shows the fully loaded M1000e chassis enclosure comprised of eight sleeves, each with four stackable blades, for a total of 32 M420 modules.

Figure 3. M1000e chassis enclosure with 32 M420 blades

The M420 module shown in Figure 4 supports up to six DIMMS, two processors, and many other features that are described in this guide.

Figure 4. M420 internal module view

For additional system views, see the *Dell M420 Systems Owner's Manual* on Support.Dell.com/Manuals.

Module features

Table 4 lists the modules features for the M420 system. For additional information on these features, see the *Dell PowerEdge M420 Systems Owner's Manual* on Support.Dell.com/Manuals.

Table 4. Module features

Feature	Description
USB connectors	Two front-accessible USB connectors
Status indicator	Indicator for M420 power status
Drives	Two front-accessible, hot-plug, 1.8-inch SSD; see the Storage section for details
Drive activity LEDs	Indicate the status and activity of the SSD
Blade handle release button	Release button on the front handle of the blade server
Trusted Platform Module (TPM)	TPM is used to generate/store keys, protect/authenticate passwords, and create/store digital certificates; it also supports the Intel Xeon TXT functionality
Quick Resource Locator (QRL)	This code on the module can be scanned by a smartphone application to access information about the server

LCD control panel

The M1000e chassis enclosure LCD control panel is located on the front of the M1000e chassis to provide user access to buttons, display, and I/O interfaces. For more information on the M1000e LCD control panel, see the *Dell PowerEdge M1000e Enclosure Owner's Manual* on Support.Dell.com/Manuals.

Quick Resource Locator

A useful feature included with Dell PowerEdge 12th generation servers is the Quick Resource Locator (QRL)—a model-specific Quick Response (QR) code (shown in Figure 5) that is located on the server. Just use your smartphone to access the Dell QRL application to learn more about the server.

Figure 5. QRL code located on module

This QRL code allows you to:

- View step-by-step videos, including overviews of system internals and externals, as well as detailed, concise, task-oriented videos and installation wizards
- Locate reference materials, including searchable owner's manual content, LCD diagnostics, and an electrical overview
- Look up your service tag so you can quickly gain access to your specific hardware configuration info and warranty information
- Contact Dell directly (by link) to get in touch with technical support and sales teams and provide feedback to Dell

These codes provide an easy way to retrieve the critical support information you need when you need it, making you more efficient and effective in managing your hardware.

M1000e chassis enclosure features

For more information on the M1000e chassis enclosure features, see the *Dell PowerEdge M1000e Enclosure Owner's Manual* on Support.Dell.com/Manuals.

4 Processors

The Dell PowerEdge M420 system features the Intel Xeon processor E5-2400 product family, offering an ideal combination of performance, power efficiency, and cost, featuring eight-core processing to maximize performance and performance/watt for datacenter infrastructures and highly dense deployments. These processors provide high performance no matter what your constraint is—floor space, power, or budget—and on workloads that range from the most complicated scientific exploration to crucial web-serving and infrastructure applications.

Processor features

The new Intel Xeon processor E5-2400 product family is designed specifically for servers and workstation applications. A summary of what's new and improved includes the following:

- Up to eight cores per processor and 64-byte cache line size
- Intel Integrated I/O has support for up to 16 lanes of PCIe 3.0, which can reduce latency
- Faster connections are provided throughout the system with support for DDR3 1600 MT/s memory and 8.0 GT/s QPI
- Intel DDIO allows I/O traffic to skip the main system memory and be directed straight to the processor cache, which can provide a significant reduction in latency as well as allowing memory to remain in a low-power state
- Intel Advanced Vector Extensions offer up to double the floating-point operations per clock cycle by doubling the length of registers, which can be useful for addressing very complex problems or dealing with large-number calculations that are integral to many technical, financial, and scientific computing problems
- Intel Turbo Boost Technology 2.0 delivers up to double the boost than the previous-generation turbo technology
- Continued improvements to both Intel TXT and AES-NI help to better protect systems and data
- Enhanced Intel Speed Step® Technology

For more information on the Intel Xeon processor E5-2400 product family, visit Intel.com.

Supported processors

The M420 supports up to two processors with up to eight cores per processor. Table 5 lists the Intel Xeon processors supported by the PowerEdge M420. For the latest information on supported processors, visit Dell.com.

Table 5. Supported processors

Model	Speed	Cache	QPI	Cores	Turbo	TDP
E5-2470	2.3GHz	20M	8.0 GT/s	8	Yes	95W
E5-2450L	1.8GHz	20M	8.0 GT/s	8	Yes	70W
E5-2450	2.0GHz	20M	8.0 GT/s	8	Yes	95W
E5-2440	2.5GHz	15M	7.2 GT/s	6	Yes	95W
E5-2430L	2.0GHz	15M	7.2 GT/s	6	Yes	60W
E5-2430	2.2GHz	15M	7.2 GT/s	6	Yes	95W
E5-2420	1.9GHz	15M	7.2 GT/s	6	Yes	95W
E5-2407	2.2GHz	10M	6.4 GT/s	4	No	80W
E5-2403	1.8GHz	10M	6.4 GT/s	4	No	80W

For information on processor installation and configuration, see the *Dell PowerEdge M420 Systems Owner's Manual* on Support.Dell.com/Manuals.

Chipset

The Intel C600 chipset is implemented on the PowerEdge M420. For more information, visit Intel.com.

5 Memory

More memory options are available than ever before with the Dell PowerEdge M420—greater capacities, higher frequencies, and more flexibility. The M420 supports up to 192 GB of memory using up to 6 GB DIMMs in a dual-processor configuration, and speeds up to 1600 MT/s, providing high performance in a variety of applications. High memory density means there is no compromise when it comes to virtualization.

Increase your uptime and reduce data loss, due to Dell's focus on reliability, availability, and serviceability (RAS) features. RAS aids in the rapid and accurate diagnosis of faults that require service, increasing your memory reliability. System uptime is reinforced with RAS features like memory mirroring, sparing, and many others.

The M420 supports registered DIMM (RDIMM) technology, which uses a buffer to reduce memory loading and allow for greater density, allowing for the maximum platform memory capacity.

Supported memory

Table 6 lists the memory technologies supported by the M420.

Table 6. Memory technologies supported

Feature	RDIMM
Register	Yes
Buffer	No
Frequencies	1333 or 1600MT/s
Ranks supported	1, 2, or 4
Capacity per DIMM	2, 4, 8, 16, or 32GB
Maximum DIMMS per channel	1
DRAM technology	x4 or x8
Temperature sensor	Yes
ECC	Yes
SDDC	Yes
Address parity	Yes

Table 7 lists the DIMMs that are supported on the M420. For the latest information on supported memory, visit Dell.com.

Table 7. DIMMs supported

Capacity (GB)	Speed (MT/s)	Type	Ranks per DIMM	Data width	SDDC support	Voltage
2	1333	RDIMM	1	x8	Advanced ECC	1.35
4	1333	RDIMM	2	x8	Advanced ECC	1.35
4	1600	RDIMM	2	x8	Advanced ECC	1.5
4	1333	RDIMM	1	x4	All modes	1.35
8	1333	RDIMM	2	x4	All modes	1.35
8	1600	RDIMM	2	x4	All modes	1.5
16	1600	RDIMM	2	x4	All modes	1.5
16	1333	RDIMM	2	x4	All modes	1.35
32[1]	1333	RDIMM	4	x4	All modes	1.35

[1]Available Q3 2012

Memory configurations

Flexible memory configurations are supported on the M420, ranging from capacities of 2 GB to 192 GB. The M420 supports up to 3 DIMMs per processor (up to 6 DIMMs in a dual-processor configuration). Each processor has three memory channels, with each channel supporting a single DIMM.

Flexible memory configuration

The M420 supports a flexible memory configuration, according to the following basic rules:

- **Speed:** If DIMMs of different speeds are mixed, all channels across all processors operate at the slowest DIMM's common frequency.

The following additional memory-population guidelines also apply to the M420:

- A single quad-rank (QR) DIMM, dual-rank (DR), or single-rank (SR) DIMM may be populated on each channel.
- DIMMs should be installed with largest rank count to smallest. For example, if DR DIMMS are mixed with SR DIMMs, DR DIMMS should be placed in the lowest DIMM slots, followed by the SR DIMMs.

For more information on memory configuration and population, see the *Dell PowerEdge M420 Systems Owner's Manual* on Support.Dell.com/Manuals.

Memory speed

Memory speeds of 1600 MT/s and 1333 MT/s are supported on the M420, depending on the DIMM types installed and the configuration. All memory on all processors and channels run at the same speed and voltage. By default, the system runs at the highest speed for the channel with the lowest DIMM voltage and speed. The operating speed of the memory is also determined by the maximum speed supported by the processor, the speed settings in the BIOS, and the operating voltage of the system.

Table 8 lists the memory configuration and performance details for the M420, based on the population of the number and type of DIMMs per memory channel.

Table 8. Memory speed capabilities

DIMM type	DIMM 0	# of DIMMs	Speed (MT/s)			
			800	1066	1333	1600
RDIMM	SR	1			•	•
	DR	1			•	•
	QR	1			•	

Memory RAS features

Reliability, availability, and serviceability (RAS) features help keep the system online and operational without significant impact to performance, and can decrease data loss and crashing due to errors. RAS aids in rapid, accurate diagnosis of faults which require service. Table 9 describes the memory RAS features supported on the M420.

Table 9. Memory RAS features

Feature	Description
Dense configuration optimized profile	Increased memory reliability can be a result from this selectable platform profile that adjusts parameters to reduce faults regarding refresh rates, speed, temperature and voltage.
Memory demand and patrol scrubbing	Demand scrubbing is the ability to write corrected data back to the memory once a correctable error is detected on a read transaction. Patrol scrubbing proactively searches the system memory, repairing correctable errors.
Recovery from single DRAM device failure (SDDC)	Recovery from Single DRAM Device Failure (SDDC) provides error checking and correction that protects against any single memory chip failure as well as multi-bit errors from any portion of a single memory chip.
Failed DIMM isolation	This feature provides the ability to identify a specific failing DIMM channel pair, thereby enabling the user to replace only the failed DIMM pair.
Memory mirroring: intra-socket	Memory mirroring is a method of keeping a duplicate (secondary or mirrored) copy of the contents of memory as a redundant backup for use if the primary memory fails. The mirrored copy of the memory is stored in memory of the same processor socket.
Memory address parity protection	This feature provides the ability to detect transient errors on the address lines of the DDR channel.
Memory sparing (rank)	Memory sparing allocates one rank per channel as a spare. If excessive correctable errors occur in a rank or channel, they are moved to the spare area while the operating system is running to prevent the errors from causing an uncorrectable failure.
Memory thermal throttling	This feature helps to optimize power/performance and can also be used to prevent DIMMs from overheating.

For information on memory mirroring and sparing configurations, see the *Dell PowerEdge M420 Systems Owner's Manual* on Support.Dell.com/Manuals. Memory RAID is not supported.

6 Storage

The Dell PowerEdge M420 provides comprehensive internal storage options, including an SSD and an H310 embedded storage controller. The M420 currently supports up to 400GB of internal storage.

SSDs are a new option that can provide vastly accelerated performance over previous technologies.

Internal storage

The M420 is available with a single-drive backplane option. Table 10 lists the backplane, storage controller, and drive type for the M420.

Table 10. Hard-drive backplane option

Backplane	Controller	Drive types
uSATA	PERC H310	SATA SSD

Supported drives

Table 11 lists the supported uniquely designed 1.8-inch universal SATA (uSATA), hot plug SSD carrier for the M420. For the latest information on supported drives, visit Dell.com/storage.

Table 11. Supported drives

Form factor	Type	Capacities
1.8”	uSATA SSD (3Gb)	50GB, 200GB

Storage controllers

Dell provides highly capable RAID options for you to ensure that your data remains safe. Dell’s RAID controller options offer impressive performance improvements.

Supported RAID controller

The newest line of PowerEdge RAID Controllers (PERCs) offers high I/O performance for a variety of uses, including database applications and streaming digital media environments.

PERC H310

The PERC H310 is an eight-port, internal, 6Gb/s PCIe RAID controller (mini form factor) that is a low-cost, entry-level RAID solution.

For more information about the latest PERC offerings, see Dell.com/PERC.

RAID controller feature support

Table 12 lists the features supported by the RAID controller on the M420.

Table 12. RAID controller feature support

Feature	PERC option
	H310
iMR firmware stack	✓
SSD support	✓
uSATA backplane	✓
SAS hard drives	✓
Unconfigured drive support (non-RAID)	✓
RAID 0	✓
RAID 1	✓
Microsoft Windows support	✓
Linux support	✓
Virtualization support	✓
Embedded on system board	✓
PCIe 3.0	✓
Local support for self-encrypting disk (SED)	✓
UEFI browser	✓
Hll	✓

7 Networking and mezzanine cards

The Dell PowerEdge M420 offers balanced, scalable I/O capabilities, including one integrated PCIe 3.0 capable mezzanine card slot.

System management integration

With M420, the job of deploying, updating, and monitoring is fast and easy. System management integration features include the following:

- Pre-boot: Use the Dell Lifecycle Controller graphical user interface (GUI) to set configuration such as bandwidth allocation or firmware revision level.
- Post-boot: Agent-free out-of-band or high-speed in-band connection over LOM through the Operating System/BMC pass-thru feature for sensory information.
- Automation of firmware and driver version deployment upon component replacement.
- Automatic monitoring of NIC status and notification on SNMP traps.
- Local or remote re-configuration of any NIC, physical or virtual.
- PXE boot enabled on LOM for ease-of-use.
- Boot from SAN (iSCSI, FCoE) configuration for networking devices through the USC.

Expansion connectors

The M420 PCIe expansion connectors provide the following support:

- Mezzanine Cards: A custom mezzanine connector that connects to a x8 PCIe 3.0 port.
  - The mezzanine card slot supports Fabric B or Fabric C, depending on the slot in the sleeve where the blade is installed. This card must match the fabric type of the I/O modules installed in the corresponding I/O module bays. Figure 6 illustrates the interconnectivity matrix and Figure 7 illustrates interconnectivity examples for Fabric A and Fabrics B and C.
- LOM: A custom network controller connector that connects to a x8 PCIe 3.0 slot.
  - LOM controller through a dedicated 1 x8 PCIe 2.0 or 3.0 compatible interface
  - Supports the embedded Broadcom 57810S-k 2P 10Gb
  - iDRAC7 shared LOM is not supported, the blade iDRAC has a dedicated 100Mbps link
- Embedded PERC: A custom PERC + RIPS connector connects to a x4 PCIe slot.

Mezzanine cards

The M420 provides one PCIe 3.0 mezzanine connector for add-in cards. The M420 is designed to be PCIe 3.0-compliant to take full advantage of the processor capabilities. Installation of a mezzanine card requires an M1000e I/O Module (IOM) of the same fabric technology to be installed in the corresponding fabric slot of the mezzanine card to support data flow through the fabric/slot. Table 13 lists the supported mezzanine cards for the M420.

Table 13. Supported mezzanine cards

Type	Adapter
1Gb/10GB Adapters	Broadcom 5719 Serdes 4P 1Gb
	Intel I350 Serdes 4P 1Gb
	Broadcom 57810S-k 2P 10Gb

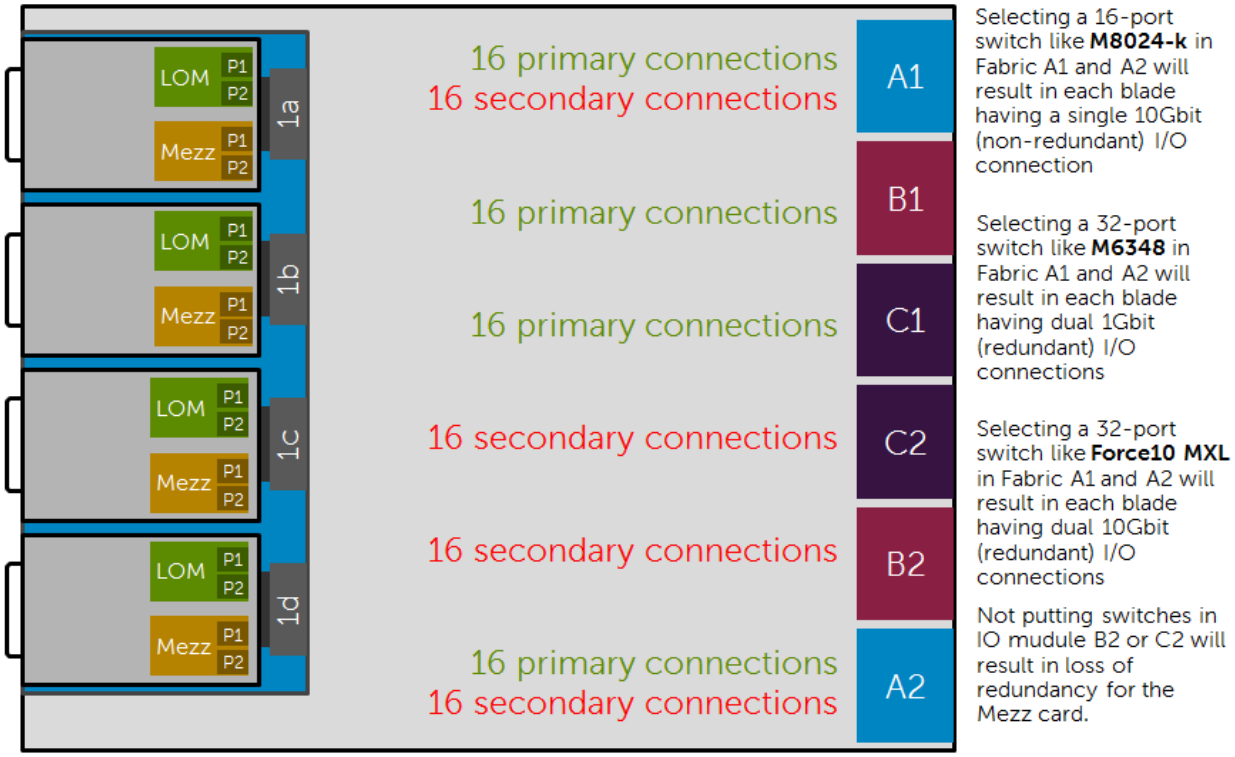
Type	Adapter
	Intel X520 – x/k 2P 10Gb
	Qlogic QME8262-k 2P 10Gb
	Brocade BR1741M-k 2P 10Gb
Infiniband	Mellanox FDR10 CX-3 40Gb
Fibre Channel	QLogic QME2572 2P 8Gb
	Emulex LPe1205-M 2P 8Gb

For the latest information on supported mezzanine cards for the M420, visit Dell.com.

Interconnectivity matrix

The full-height, single wide M420 sleeve holds up to four M420 blades in four slots a, b, c, and d. A maximum of eight sleeves fit into a single M1000e chassis. Understanding how the blades connect demonstrates the impact of switch choice on the number of available ports, as shown in Figure 6. Blades connect to Fabrics B and C differently depending on the slot within the M420 sleeve.

Figure 6. M420 connectivity matrix for 32 blades


LOM
P1
P2
Mezz
P1
P2
1a
1b
1c
1d
16 primary connections
16 secondary connections
16 primary connections
16 primary connections
16 secondary connections
16 secondary connections
16 primary connections
16 secondary connections
A1
B1
C1
C2
B2
A2
Selecting a 16-port switch like M8024-k in Fabric A1 and A2 will result in each blade having a single 10Gbit (non-redundant) I/O connection
Selecting a 32-port switch like M6348 in Fabric A1 and A2 will result in each blade having dual 1Gbit (redundant) I/O connections
Selecting a 32-port switch like Force10 MXL in Fabric A1 and A2 will result in each blade having dual 10Gbit (redundant) I/O connections
Not putting switches in IO mudule B2 or C2 will result in loss of redundancy for the Mezz card.

Blades in slot A

Port	Connects to fabric
LOM Primary	A1
LOM Secondary	A2
Mezz Primary	C1
Mezz Secondary	C2

Blades in slot B

Port	Connects to fabric
LOM Primary	A2
LOM Secondary	A1
Mezz Primary	B1
Mezz Secondary	B2

Blades in slot C

Port	Connects to fabric
LOM Primary	A1
LOM Secondary	A2
Mezz Primary	C1
Mezz Secondary	C2

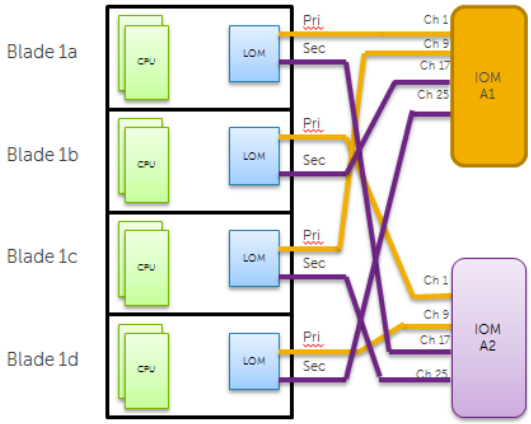
Blades in slot D

Port	Connects to fabric
LOM Primary	A2
LOM Secondary	A1
Mezz Primary	B1
Mezz Secondary	B2

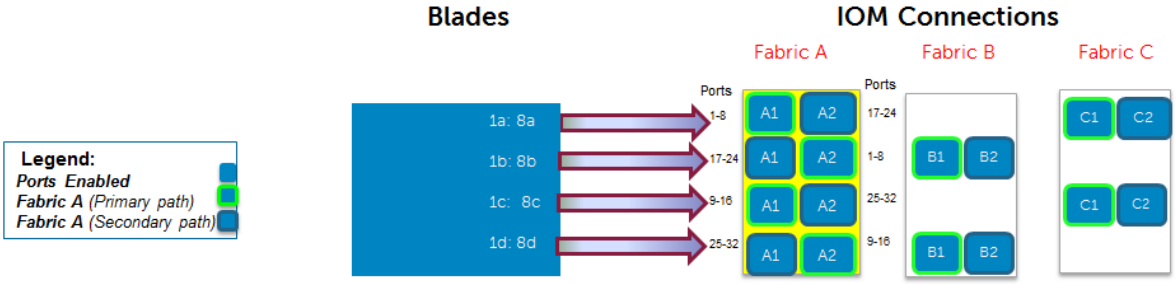
Examples of fabric interconnectivity and their associated parameters are illustrated in Figure 7.

Figure 7. Fabric interconnectivity examples

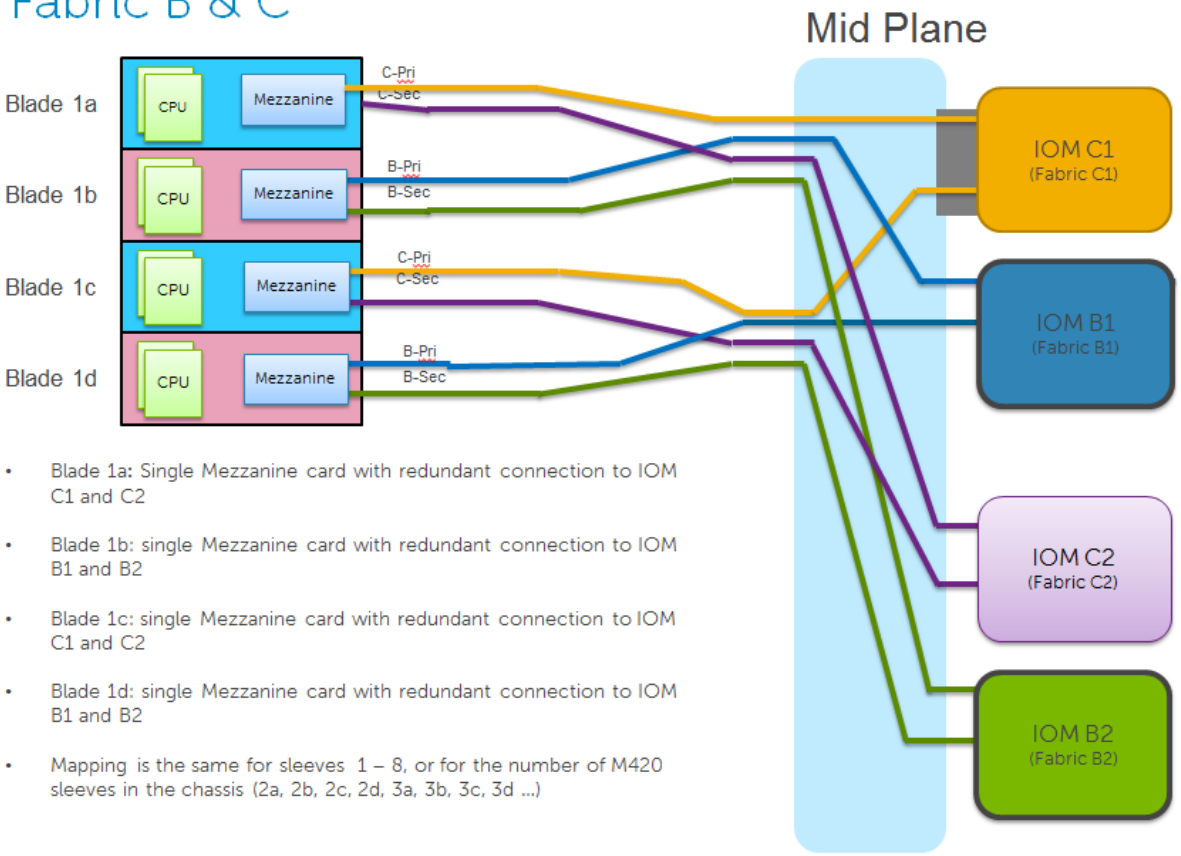
Fabric A



- Fabric A is the 10gbE Broadcom (BCM 57810s) LOM
- Fabric A choice examples:
  - 2 x M8024-k in IOM A1 and A2.
    - Each M420 blade will have a 10Gb connection to either IOMA1 or IOM A2, but not both (non-redundant).
  - 2 x M6348 in IOM A1 and A2.
    - Each M420 blade will have a 1Gb connection to both A1 and A2 (redundant).
  - 2 x Dell Force10 MXL in IOM A1 and A2 (when it ships).
    - Each M420 blade will have a 10Gb connection to both A1 and A2 (redundant).



Fabric B & C



- Blade 1a: Single Mezzanine card with redundant connection to IOM C1 and C2
- Blade 1b: single Mezzanine card with redundant connection to IOM B1 and B2
- Blade 1c: single Mezzanine card with redundant connection to IOM C1 and C2
- Blade 1d: single Mezzanine card with redundant connection to IOM B1 and B2
- Mapping is the same for sleeves 1 – 8, or for the number of M420 sleeves in the chassis (2a, 2b, 2c, 2d, 3a, 3b, 3c, 3d ...)

8 Power, thermal, and acoustics

Lower overall system-level power draw is a result of Dell's breakthrough system design. The PowerEdge M420 blade server and M1000e chassis enclosure maximize performance per watt through a combination of power and cooling, energy efficient technologies, and tools. Additionally, the M420 has an extensive collection of sensors that automatically track thermal activity, which helps regulate temperature thereby reducing server noise and power consumption.

Power consumption and energy efficiency

With the rise in the cost of energy coupled with increasing data center density, Dell provides tools and technologies to help you realize greater performance with less energy cost and waste. More efficient data center usage can reduce costs by slowing the need for additional data center space. Table 14 lists the tools and technologies Dell offers to help you achieve your data center goals by lowering power consumption and increasing energy efficiency.

Table 14. Power tools and technologies

Feature	Description
Power supply units (PSU) portfolio	Dell's PSU portfolio includes intelligent features such as dynamically optimizing efficiency while maintaining availability and redundancy.
Tools for right-sizing	**Energy Smart Solution Advisor (ESSA)** is a tool that helps you determine the most efficient configuration possible. With Dell's ESSA, you can calculate the power consumption of your hardware, power infrastructure, and storage. ESSA can help you determine exactly how much power your server will use at a given workload, and the PSU Advisor can help you choose the best, most efficient PSU for your workload. Learn more at Dell.com/calc. **Energy Smart Data Center Assessment** is a Dell Services offering that uses infrastructure and thermal analysis to help maximize system efficiency. Learn more at Dell.com/EnergySmart.
Industry compliance	Dell's servers are compliant with all relevant industry certifications and guidelines, including 80 PLUS, Climate Savers, and ENERGY STAR®.
Power monitoring accuracy	PSU power monitoring improvements include: • Dell's power monitoring accuracy is currently 1%, whereas the industry standard is 5% • More accurate reporting of power • Better performance under a power cap
Power capping	Use Dell's systems management to set the power cap limit for your systems to limit the output of a PSU and reduce system power consumption. Dell is the first hardware vendor to leverage Intel Node Manager for circuit-breaker fast capping.
Systems management	**iDRAC7 Enterprise** provides server-level management that monitors, reports, and controls power consumption at the processor, memory, and system level. **Dell OpenManage Power Center** delivers group power management at the rack, row, and data center level for servers, power distribution units, and uninterruptible power supplies.

Feature	Description
Active power management	**Intel Node Manager** is an embedded technology that provides individual server-level power reporting and power limiting functionality. Dell offers a complete power management solution comprised of Intel Node Manager accessed through Dell iDRAC Enterprise and OpenManage Power Center that allows policy-based management of power and thermals at the individual server, rack and data center level. **Hot spare** reduces power consumption of redundant power supplies. **Thermal control of fan speed** optimizes the thermal settings for your environment to reduce fan consumption and lower system power consumption. **Idle power** enables Dell servers to run as efficiently when idle as when at full workload.
Fresh Air	With the thermal design and reliability of Dell products, you can have the capability to operate at excursion-based temperatures. This solution is comprised of servers, networking, storage, and infrastructure that run beyond the industry standard of 35°C (95°F) without impacting your availability model. Find additional information at Dell.com/FreshAir.
Rack infrastructure	Dell offers some of the industry's highest-efficiency power infrastructure solutions, including: • Power distribution units (PDUs) • Uninterruptible power supplies (UPSs) • Energy Smart containment rack enclosures Find additional information at http://content.dell.com/us/en/enterprise/power-and-cooling-technologies-components-rack-infrastructure.aspx.

Find additional information at Dell.com/PowerAndCooling and Power.com/PowerCenter.

Power supply units

The M1000e chassis enclosure provides power and cooling for the M420 blade server. For information on the M1000e power supply units, see the *PowerEdge M1000e Technical Guide* on Dell.com.

Thermal and acoustics

High density and high performance of the PowerEdge M420 requires an aggressive thermal management solution to address the high heat density in the small form factor blades.

Optimized thermal management keeps fan speeds in the PowerEdge M420 as low as possible, contributing to quiet operation and ensuring proper component cooling.

Thermal design

The thermal design of the PowerEdge M420 reflects the following:

- **Comprehensive thermal management:** The PowerEdge M420 dynamically controls system cooling fan speed, based on responses from critical sensors that monitor the temperature of several components, including:
  - Processors
  - DIMMs
  - System inlet ambient
  - Mezzanine card

Thermal control also detects and responds to hardware configuration. Thermal management adjusts cooling according to what the system really needs, and draws lower fan power draw and generates lower acoustical noise levels than those without such controls.

- **Environmental specifications:** The optimized thermal management makes the PowerEdge M420 reliable under a wide range of operating environments as shown in Table 22. When operating above 30°C ambient, performance impacts may be seen. For more information see the *Dell PowerEdge M420 Systems Owner's Manual* on Support.Dell.com/Manuals.

Acoustical performance

The acoustical performance of the PowerEdge M420 is reflected in Table 15.

Four sleeves, each containing four typically[1] configured M420 blades, were installed in the M1000e host chassis; all blades had the same configuration and same airflow impedance. Remaining blade slots were filled with blanks of same impedance as blades. Acoustical measurements were made in 23 ± 2 °C ambient.

The M420 is built for high density and high performance. The great power density of the M420 means that small increases in utilization require large increases in fan speed hence large increases in loudness. This means that loudness with M420s increases significantly with utilization; in fact, more so than other Dell blade products.

Table 15. M420 acoustical performance

Configuration (23 ± 2°C ambient)	CPUs	Drives	DIMMs	PCI cards	Operating mode	L_{WA}-UL[2] (bels)	L_{pA}[3] (dBA)
Typical[1]	2 x 95W	1 x uSATA SSD	6	1 mezzanine card	Operating[4]	8.9	71
					Idle[5]	7.9	63

[1]Typical configuration means 2x 95W CPUs, x 2GB DIMMs, 1x Mezzanine card, and 1x uSATA SSD.

[2] L_{WA}-UL is the upper limit sound power levels (L_{WA}) calculated per section 4.4.1 of ISO 9296 (1988) and measured in accordance to ISO 7779 (2010).

[3] L_{pA} is the average A-weighted sound pressure level from the four bystander positions calculated per section 4.3 of ISO 9296 (1988) and measured in accordance with ISO 7779 (2010). The system is placed in a half rack enclosure (base of system is 25 cm above reflective floor).

[4]Operating is a mode per ISO 7779 (2010) definition 3.1.6. Blade stressing applications vary widely thus also do respective operating acoustical values; the values are given above as a likely range, for example, "likely greater than or equal to," (≥). SPECPower™ at 50% utilization is the benchmark used for the lower bound here.

[5]Idle: Reference ISO 7779 (2010) definition 3.1.7; system is running in its operating system but no other specific activity;

9 Operating systems and virtualization

The Dell PowerEdge M420 supports a wide range of industry-standard operating systems and virtualization software.

Supported operating systems

Table 16 lists the operating systems supported on the M420. For the latest information on supported operating systems, see Dell.com/OSsupport.

Table 16. Primary operating system support

Operating System	Platform	Edition
Red Hat Enterprise Linux 6.2[1]	x64	N/A
Red Hat Enterprise Linux for HPC Compute Node	x64	N/A
SUSE® Linux Enterprise Server 11 SP2	x64	N/A
SUSE Linux Enterprise Server 10 SP4	x64	N/A
Microsoft Windows Server 2008 with SP2	x86	Standard Enterprise
	x64 (with Microsoft Hyper-V™ role enabled)	Standard Enterprise Datacenter
Microsoft Windows Server 2008 R2 with SP1	x64 (with Microsoft Hyper-V role enabled)	Standard Enterprise Datacenter HPC

[1]RHEL 6.2 is the minimum supported version. Current factory install is RHEL 6.1.

Support of the operating systems listed in Table 17 is limited to a virtual environment as a guest operating system. Please contact the software vendor for additional support or questions about running the operating system in a virtualized environment.

Table 17. Virtual guest operating system support

Operating System	Platform	Edition
Microsoft Windows 2003	x86	Web
Microsoft Windows 2003 R2 with SP2	x86	Standard Enterprise
	x64	Standard Enterprise Datacenter

Supported virtualization

One of the key features for virtualization on the M420 is the support for a fail-safe hypervisor. By running the hypervisor on an optional SD card and installing a backup copy on the other mirrored SD card, you can protect against hardware failure and maximize virtualization uptime. Table 18 highlights the virtualization support for the M420.

Table 18. Virtualization support

Operating systems		Version	Options
VMware[1]	vSphere v4.1 U2	ESX Classic	DIB
	vSphere v4.1 U2	ESXi Installable vSphere v4.1 U2 ESXi Embedded FI	DIB
	vSphere v5.0	ESXi (one version)	DIB
	vSphere v5.0 U1	ESXi (one version)	FI/DIB
Citrix	XenServer v6.0	—	DIB
Red Hat[2]	Enterprise Virtualization 3.0	N/A	DIB

FI = factory install; DIB = drop in box

[1]vSphere Fault Tolerance is supported with these versions.

[2]No OpenManage support; drop in box license registration card only.

10 Dell OpenManage systems management

Whether your IT environment consists of a few servers or a few thousand servers, Dell OpenManage systems management solutions provide comprehensive management for evolving IT environments. OpenManage is based on open standards and provides agent-based and agent-free server lifecycle management functionality for Dell PowerEdge servers. OpenManage solutions help you automate and streamline essential hardware management tasks.

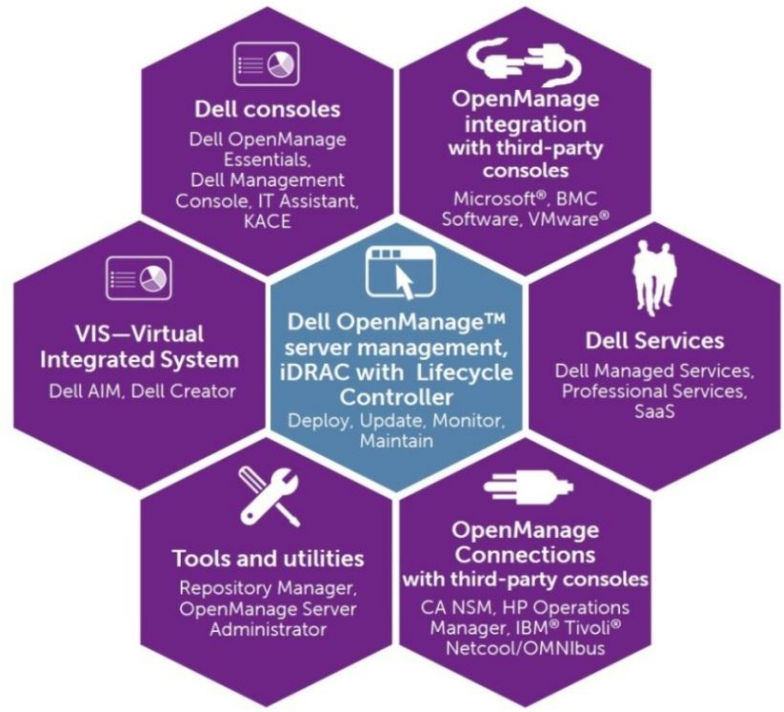
The advanced management capabilities of Dell OpenManage also integrates into offerings from other popular systems management solutions that you may already use, making Dell platforms easy to manage and deploy in any IT environment. This ensures your IT services are available when your business needs them. If you have already standardized on offerings from industry leaders, such as BMC Software, Microsoft, Symantec, VMware, or other vendors, you can leverage OpenManage integration and connections developed for use with your existing systems management framework to efficiently manage Dell servers, storage, business-client PCs, and network devices.

Start with a firm foundation for efficient hardware management using OpenManage tools, utilities, and management consoles. OpenManage systems management solutions consist of a combination of embedded management features and software products that help you automate and simplify the entire server lifecycle: deploy, update, monitor, and maintain. OpenManage solutions are innovatively designed for simplicity and ease of use to help you reduce complexity, save time, achieve efficiency, control costs, and empower productivity.

Systems management solutions

Dell systems management solutions include a wide variety of tools, products, and services that enable you to leverage an existing systems management framework. As shown in Figure 8, Dell systems management solutions are centered around OpenManage server management, featuring iDRAC with Lifecycle Controller.

Figure 8. Dell systems management solutions


Dell consoles
Dell OpenManage Essentials, Dell Management Console, IT Assistant, KACE
OpenManage integration with third-party consoles
Microsoft®, BMC Software, VMware®
VIS—Virtual Integrated System
Dell AIM, Dell Creator
Dell OpenManage™ server management, iDRAC with Lifecycle Controller
Deploy, Update, Monitor, Maintain
Dell Services
Dell Managed Services, Professional Services, SaaS
Tools and utilities
Repository Manager, OpenManage Server Administrator
OpenManage Connections with third-party consoles
CA NSM, HP Operations Manager, IBM® Tivoli® Netcool/OMNIbus

OpenManage systems management

The Dell OpenManage systems management portfolio includes powerful hardware and software management tools and consoles. OpenManage simplifies the lifecycle of deploying, updating, monitoring, and maintaining your Dell PowerEdge servers.

iDRAC7 with Lifecycle Controller

The Integrated Dell Remote Access Controller 7 (iDRAC7) with Lifecycle Controller is the heart of the 2nd generation of Dell PowerEdge server embedded management functionality. In addition to enabling agent-free management, iDRAC7 with Lifecycle Controller provides remote access to the system—whether or not there is a functioning operating system running on the server. These embedded features improve all aspects of a typical server lifecycle. Table 19 describes the functions and benefits of iDRAC7 with Lifecycle Controller.

Table 19. iDRAC7 with Lifecycle Controller functions and benefits

Feature	Function	Benefit
Out of band (OOB)	iDRAC7 offers real-time OOB discovery, inventory, deployment monitoring, alerting and updates for servers and internal storage	Manage servers independent of the OS type or status—even if an OS is not installed
Single code base	All server types have the same embedded management hardware and firmware	Simplified and consistent maintenance across server platforms
Dedicated GigE port (PowerEdge rack and tower systems)	Gigabit Ethernet replaces 10/100 on predecessor iDRAC6	Fast throughput for better performance; compatibility with setup for switches
Email alerts	Simplified, more informative, and expanded coverage than previous versions of iDRAC	More detail allows IT administrators to be more efficient in diagnosing and remediating an issue; alerts include a direct, embedded URL in the email notification to further speed resolution
vFlash media	Enabled with iDRAC7 Enterprise	Allows for use of a non-Dell SD card
Enhanced power management	Integration with Intel Node Manager provides data center level power monitoring and capping (requires iDRAC7 Enterprise)	Fine tune data center power policies, capping, and usage; report on historical power usage by rack, row or room using Power Center Manager
Electronic licensing	To obtain a software license key for iDRAC7 Express for Blades or iDRAC7 Enterprise after server purchase, submit a request to purchase a software license key through the Dell Licensing Portal or with a Dell sales representative	If iDRAC7 Express for Blades or iDRAC7 Enterprise is ordered during initial point of sale, license key is installed. If Basic Management is ordered during initial point of sale, customer must request a license key through the Dell Licensing Portal. For most server models, embedded server management and electronic licensing enables feature enhancements that do not require installation of additional hardware or system downtime.

iDRAC7 Enterprise is available for the PowerEdge M420, and Dell also offers an option of iDRAC7 Express for Blades. A detailed feature comparison for iDRAC7 Enterprise and iDRAC7 Express for Blades is shown in Table 20.

Table 20. Feature comparison for iDRAC7 Enterprise and iDRAC7 Express for Blades

Feature (function)	iDRAC7 Enterprise	iDRAC7 Express for Blades
Local configuration with USC	•	•
IPMI 2.0	•	•
Embedded diagnostics	•	•
Local OS install	•	•
Local updates	•	•
Driver pack	•	•
Encryption	•	•
Dedicated NIC 1Gbps (100MB in iDRAC6)	•[1]	•[1]
IPv6	•	•
Auto-discovery	•	•
Auto-recovery	•	•
Web GUI	•	•
Remote CLI	•	•
Local/SSH CLI	•	•
Serial redirection	•	•
Remote configuration	•	•
Remote update	•	•
Email alerts	•	•
SNMP alerts	•	•
Comprehensive monitoring	•	•
Virtual console (4 user)	•	•[2]
Virtual media	•	•
Crash screen capture[3]	•	•
Power control	•	•
Power monitoring	•	•
Virtual console chat	•	
Support for customer-supplied SD cards for	•	

Feature (function)	iDRAC7 Enterprise	iDRAC7 Express for Blades
Virtual flash partitions	•	
Virtual folders	•	
Remote file share	•	
Crash video playback	•	
Boot record/playback	•	
Part replacement	•	
Backup and restore configurations	•	
Power capping	•	
Enterprise group power management	•	
Directory services (AD, LDAP)	•	
PK authentication	•	
Two-factor authentication[4]	•	

[1]Blade-to-chassis internal connection is 100MB; [2]Single user; [3]Requires OMSA agent on target server; [4]Uses Microsoft® ActiveX® on Internet Explorer® only

Agent-based management

Most systems management solutions require pieces of software, called agents, to be installed on each node in order to be managed within the IT environment. Additionally, the same agent is often used as a local interface into the hardware health and may be accessed remotely as a management interface, typically referred to as a one-to-one interface. For customers that continue to use agent-based solutions, Dell provides OpenManage Server Administrator.

OpenManage Server Administrator

The Dell OpenManage Server Administrator (OMSA) agent gives you a comprehensive, one-to-one systems management solution for both local and remote servers and their storage. OMSA can help simplify single-server monitoring with a secure command-line interface (CLI) or Web-based management graphical user interface (GUI). It can also be used to view system configuration, inventory, health, and performance.

Agent-free management

Because Dell PowerEdge servers have embedded server lifecycle management, in many cases, there is no need to install an OpenManage systems management software agent into the operating system of a Dell PowerEdge server. This greatly simplifies and streamlines the management footprint.

Chassis Management Controller console for blade systems

The Dell Chassis Management Controller (CMC) is a systems management hardware and software solution for managing multiple Dell blade chassis. The CMC is a hot-pluggable module inserted in the back of a Dell blade chassis. It provides a secure interface that enables an administrator to inventory, perform configuration and monitoring tasks, remote power on/off blades, and enable alerts for events on servers and components in the blade chassis.

The CMC utilizes iDRAC with Lifecycle Controller to perform management functions, such as opening a remote console session from the CMC interface.

Dell consoles

The central console in a systems management solution is often referred to as the one-to-many console. The central console provides a rapid view and insight into the overall health of all systems in the IT environment. The Dell systems management portfolio includes several powerful consoles, depending upon your needs, including the following:

- **Dell OpenManage Essentials**— OpenManage Essentials (OME) is a recently released systems management console that provides a comprehensive view of Dell systems, devices, and components in an enterprise network. It is used to monitor Dell PowerEdge servers, EqualLogic™ and PowerVault™ storage, and PowerConnect™ switches; to update and configure Dell servers; and to create asset reports. OpenManage Essentials also communicates health status alerts for Dell servers, storage, and network devices to the Dell KACE™ K1000 service desk. OpenManage Essentials is available as a no-charge software download from Support.Dell.com.
- **Dell Management Console**—Dell Management Console (DMC) offers sophisticated data-center management capabilities with comprehensive reporting features. DMC can perform basic hardware management and can manage operating systems and applications using various plug-ins from Symantec.
- **Dell IT Assistant**—Dell IT Assistant (ITA) is a console for managing Dell servers, storage arrays, and other components distributed throughout a network. Dell IT Assistant allows for easy identification of system issues through alerts, helping to reduce system downtime. Systems administrators can easily monitor systems anywhere within their network using ITA. ITA is supported on the M420; however, enhanced functionality is now available with OpenManage Essentials.

OpenManage systems management tools and utilities

Dell OpenManage systems management tools and utilities consist of the following:

- **Dell Repository Manager**—The Dell Repository Manager (RM) is a standalone GUI-based productivity tool that helps simplify the process of managing downloads and baseline BIOS, firmware, and driver updates. Repository Manager can create deployment disks as well as create and manage customized repositories.
- **Dell OpenManage Server Update Utility**—The Dell Server Update Utility (SUU) is a DVD-based application for identifying and applying BIOS and firmware updates to your Dell PowerEdge servers.
- **Dell OpenManage Systems Build and Update Utility**—The Dell System Build and Update Utility (SBUU) provides one-to-one and one-to-many deployment and single-server update capabilities in the pre-operating system environment.
- **Dell Update Packages—**The Dell Update Packages (DUP) is a self-contained executable in a standard package format that updates a software element on a Dell server such as the BIOS, a driver, firmware and other software updates.
- **Dell OpenManage Deployment Toolkit**—The Dell OpenManage Deployment Toolkit (DTK) is a CLI-based tool that includes a set of utilities for configuring and deploying Dell PowerEdge systems, and can be used to build scripted, unattended OS installations to deploy large numbers of servers in a reliable fashion.
- **RACADM**—The RACADM command-line utility provides a scriptable interface that allows you to locally or remotely configure iDRAC7.
- **IPMITool**—IPMITool includes scriptable console application programs used to control and manage remote systems using the IPMI version 1.5 and later protocol.

Integration with third-party consoles

Dell OpenManage easily integrates with several leading third-party consoles, including:

- **Dell Server Management Pack Suite for Microsoft System Center Operations Manager (SCOM)**—This suite of server management packs enables several functions through System Center Operations Manager, including in-band discovery and monitoring of racks and towers, out-of-band discovery and monitoring through iDRAC with Lifecycle Controller, as well as performance and advanced monitoring.
- **Dell Lifecycle Controller Integration (DLCI) for Microsoft System Center Configuration Manager (SCCM)**—This pack contains Dell Lifecycle Controller Integration (DLCI), which integrates OpenManage functions in SCCM to manage the Dell PowerEdge servers, including auto-discovery, operating system deployment and configuration of hardware elements, (RAID, NIC, BIOS, iDRAC), OS and hypervisor agnostic updates, firmware management, and system viewer utilities.
- **Dell Server PRO Management Pack for Microsoft System Center Virtual Machine Manager (SCVMM)**—This pack manages Dell physical servers and hosts of virtual machines (VMs) by using Microsoft System Center Operations Manager/System Center Essentials (SCOM/SCE) and System Center Virtual Machine Manager (SCVMM). It provides guidance for remedial actions based on alerts to best manage virtual machines and handle the impacts appropriately.
- **Dell Management Plug-in for VMware® vCenter™**—This plug-in allows IT administrators to monitor, provision, and manage the physical PowerEdge server hardware and firmware from a dedicated Dell menu accessed through the VMware vCenter console using the same role-based access control model as vCenter, combining physical server management.
- **BMC Software**—Dell and BMC Software work together to simplify IT by ensuring tight integration between Dell server, storage, and network management functionality and the BMC Software process and data center automation products.

OpenManage Connections with third-party consoles

Dell OpenManage provides connections with many third-party consoles, including:

- **Dell OpenManage Connection for Computer Associates Network and Systems Management**—This connection allows you to monitor PowerEdge servers and PowerVault storage arrays from within the Computer Associates Network and Systems Management (CA NSM) console.
- **Dell OpenManage Connection for HP Operations Manager**—This connection enables several functions through HP Operations Manager, including auto-grouping, SNMP trap reception, global health monitoring, and a context-sensitive launch of OpenManage Server Administrator.
- **Dell OpenManage Connection for IBM Tivoli Netcool/OMNIBus**—This connection provides event monitoring capabilities to monitor Dell PowerEdge servers and Dell EqualLogic systems. It allows event monitoring, automatic event correlation, and launching device consoles from the Netcool/OMNIbus console.

Dell server management operations

Dell OpenManage systems management is centered on automating the server management lifecycle—deploy, update, monitor, and maintain. To manage an infrastructure properly and efficiently, you must perform all of these functions easily and quickly. iDRAC7 with Lifecycle Controller technology provides you with these intelligent capabilities embedded within the server infrastructure. This allows you to invest more time and energy on business improvements and less on maintenance. Figure 9 illustrates the various operations that can be performed during the server's lifecycle.

Figure 9. Systems management server lifecycle

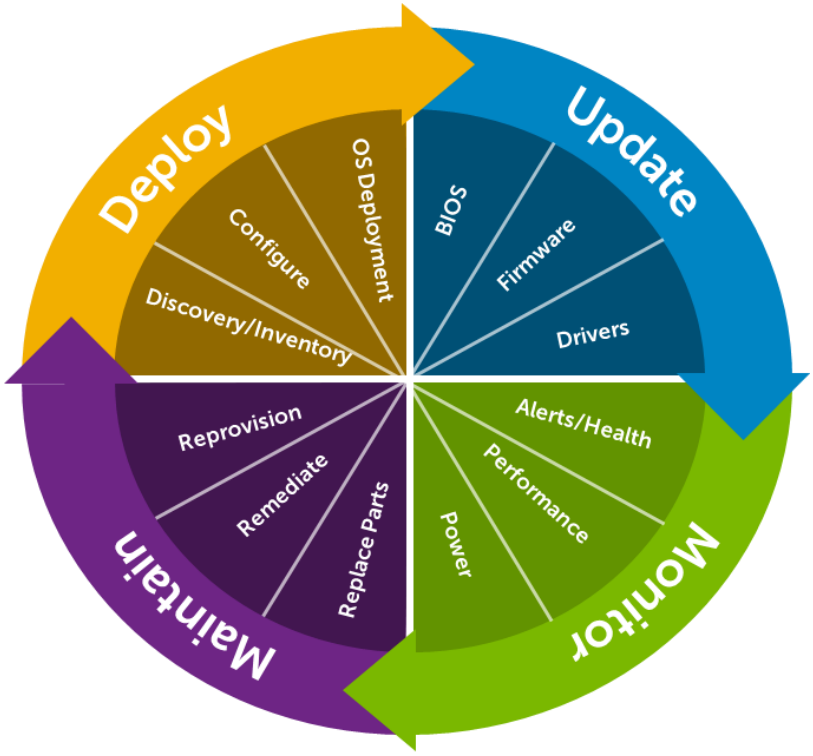


Table 21 lists the products that are available for one-to-one and one-to-many operations, and when they are used in the server's lifecycle:

Table 21. One-to-one and one-to-many operations

Operation	One-to-one	One-to-many	
Deploy	• Lifecycle Controller GUI • DTK • SBUU	• Symantec Deployment Server • Dell Management Plug-in for VMware vCenter • KACE K1000 Appliance • Lifecycle Controller Remote Services • BMC BladeLogic integration with Lifecycle Controller	• Dell Server Deployment Pack (DSDP) for Microsoft System Center Configuration Manager and Dell Lifecycle Controller Integration (DLCI) for Microsoft System Center Configuration Manager
Update	• iDRAC7 with LifeCycle Controller • Lifecycle Controller GUI • Repository Manager • DUP • SUU • SBUU • Dell Management Plug-in for VMware vCenter	• Dell OpenManage Essentials • Dell OpenManage ITA • Dell Management Console • Lifecycle Controller Remote Services	• Dell Update Catalogs for Microsoft System Center Configuration Manager • Dell Lifecycle Controller Integration (DLCI) for Microsoft System Center Configuration Manager

Operation	One-to-one	One-to-many	
Monitor	• iDRAC7 • OMSA	• Dell OpenManage Essentials • Dell OpenManage ITA • BMC ProactiveNet Performance Management • Dell OpenManage Power Center • Dell Management Console	• Dell Management Plug-in for VMware vCenter • BMC ProactiveNet • Dell Server Management Pack Suite for Microsoft System Center Operations Manager (SCOM)
Maintain	• IPMI • iDRAC7 • Lifecycle Controller GUI	• Lifecycle Controller Remote Services	**Remediate:** • Dell Server PRO Management Pack for Microsoft System Center Virtual Machine Manager (SCVMM) **Replace parts:** • Dell Lifecycle Controller Integration (DLCI) for Microsoft System Center Configuration Manager

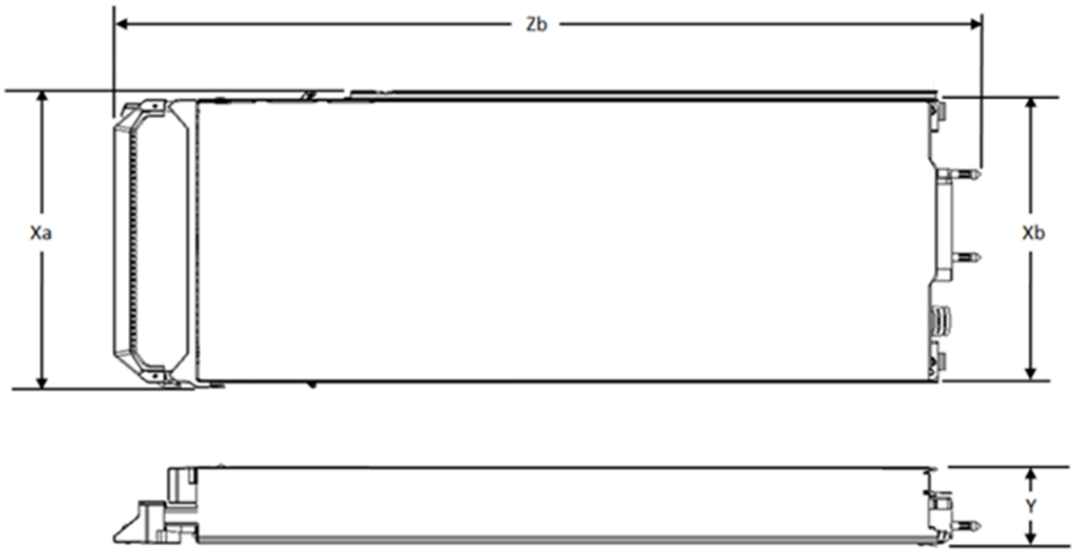
For additional detailed information on Dell's systems management portfolio, see the *Dell Systems Management Overview Guide* on Support.Dell.com/Manuals.

Appendix A. Additional specifications

Module dimensions and weight

Figure 10 details the dimensions of the M420 module.

Figure 10. Module dimensions



Xa	Xb	Y	Zb (handle closed)	Zb (handle open)
97.5mm	93.8mm	50.5mm	501.5mm	564.9mm

The weight of a maximum-configured M420 blade server is 12.0 kg (26.5 lb).

Environmental specifications

For the most up-to-date information on the M420 environmental specifications, see the *Dell PowerEdge M420 Systems Owner's Manual* and the *Dell PowerEdge M420 Getting Started Guide* on Support.Dell.com/Manuals. additional information about environmental measurements for specific system configurations, see Dell.com/environmental_datasheets.

Table 22 details the environmental specifications for the M420.

Table 22. Environmental specifications

Temperature and humidity	
Continuous operation	10°C to 35°C at 20% to 80% relative humidity (RH), with 26°C max dew point. De-rate maximum allowable dry bulb temperature at 1°C per 300m above 900m (1°F per 550 ft).
Expanded operation	When operating in the expanded temperature range, system performance may be impacted. When operating in the expanded temperature range, ambient temperature warnings may be reported on the LCD and in the System Event Log.

Temperature and humidity	
	< 10% of annual operating hours: 5°C to 40°C at 5% to 85% RH with 26°C dew point. Outside the standard operating temperature (10°C to 35°C), the system can operate down to 5°C or up to 40°C for a maximum of 10% of its annual operating hours. For temperatures between 35°C and 40°C, de-rate maximum allowable dry bulb temperature by 1°C per 175 m above 950m (1°F per 319 ft). **< 1% of annual operating hours:** –5°C to 45°C at 5% to 90% RH with 26°C dew point. Outside the standard operating temperature (10°C to 35°C), the system can operate down to –5°C or up to 45°C for a maximum of 1% of its annual operating hours. For temperatures between 40°C and 45°C, de-rate maximum allowable dry bulb temperature by 1°C per 125m above 950m (1°F per 228 ft). **Expanded operating temperature restrictions:** • Single processor configuration is required.
Storage	–40 °C to 95 °C (–40 ° F to 203 °F) with a maximum temperature gradation of 10 °C per hour

Video specifications

The Dell PowerEdge M420 iDRAC incorporates an integrated video subsystem. The graphics controller is the 2D Matrox® G200. The video frame buffer (16MB) is contained within the iDRAC RAM (256MB) device.

The M420 system supports the 2D graphics video modes in Table 23.

Table 23. Supported video modes

Resolution	Refresh Rate (Hz)	Color Depth (bit)
640 x 480	60, 70	8, 16, 32
800 x 600	60, 75, 85	8, 16, 32
1024 x 768	60, 75, 85	8, 16, 32
1280 x 1024	60, 75	8, 16, 32
1440 x 900 (stretch goal)	60	8, 16, 32

USB peripherals

USB peripherals are supported through the front USB ports. They are USB 2.0 compliant.

Appendix B. Standards compliance

The M420 system conforms to the industry standards in Table 24.

Table 24. Industry standard documents

Standard	URL for information and specifications
ACPI Advance Configuration and Power Interface Specification, v2.0c	www.acpi.info
Ethernet IEEE 802.3-2005	standards.ieee.org/getieee802/802.3.html
HDG Hardware Design Guide Version 3.0 for Microsoft Windows Server	www.microsoft.com/whdc/system/platform/pcdesign/desguide/serverdg.mspx
IPMI Intelligent Platform Management Interface, v2.0	www.intel.com/design/servers/ipmi
DDR3 Memory DDR3 SDRAM Specification, Rev. 3A	www.jedec.org/download/search/JESD79-3C.pdf
LPC Low Pin Count Interface Specification, Rev. 1.1	developer.intel.com/design/chipsets/industry/lpc.htm
PCI Express PCI Express Base Specification Rev. 2.0 and 3.0	www.pcisig.com/specifications/pciexpress
PMBus Power System Management Protocol Specification, v1.2	pmbus.info/specs.html
SAS Serial Attached SCSI, v1.1	www.t10.org
SATA Serial ATA Rev. 2.6; SATA II, SATA 1.0a Extensions, Rev. 1.2	www.sata-io.org www.sata-io.org
SMBIOS System Management BIOS Reference Specification, v2.7	www.dmtf.org/standards/smbios/
TPM Trusted Platform Module Specification, v1.2	www.trustedcomputinggroup.org
UEFI Unified Extensible Firmware Interface Specification, v2.1	www.uefi.org/specs
USB Universal Serial Bus Specification, Rev. 2.0	www.usb.org/developers/docs
Windows Logo Windows Logo Program System and Device Requirements, v3.10	www.microsoft.com/whdc/winlogo/hwrequirements.mspx

Appendix C. Additional resources

Table 25 provides a list of documents and websites that provide for more information on the Dell PowerEdge M420.

Table 25. Additional resources

Resource	Description of contents	Location
PowerEdge M420 Systems Owner's Manual	This manual is provided in HTML format on the CD provided with the M420 system, and also in HTML and PDF format at the Dell support site. A printed version is available in Asian languages as a customer-orderable option. This manual provides information on the following: • Chassis features • System Setup program • System messages • System codes and indicators • System BIOS • Remove and replace procedures • Troubleshooting • Diagnostics • Jumpers and connectors	Support.Dell.com/Manuals
PowerEdge Modular Systems Hardware Owner's Manual	This manual provides information on the PowerEdge M1000e chassis enclosure and its supported blade server modules.	Support.Dell.com/Manuals
Dell PowerEdge M1000e, M915, M910, M710HD, M710, M420, M610x, and M610 Getting Started Guide	This guide is printed and shipped with the system, and is also available in PDF format on the Dell support site. This guide provides information on the following: • Initial setup steps • Key system features • Technical specifications	Support.Dell.com/Manuals
System Information Label	The system information label documents the system board layout and system jumper settings.	On the module
Quick Resource Locator (QRL)	This code on the chassis can be scanned by a phone application to access additional information and resources for the server, including videos, reference materials, service tag information, and Dell contact information.	On the module
Information Update	This document is printed and shipped with the system, and is also available in PDF format on the Dell support site. This guide provides system update information.	Support.Dell.com/Manuals
PowerEdge M1000e Technical Guide	This guide provides detailed technical information on the M1000e chassis enclosure and its supported features.	Dell.com
Dell Energy Smart Data Center Assessment	uses infrastructure and thermal analysis to help maximize system efficiency	Dell.com/EnergySmart

Resource	Description of contents	Location
Energy Smart Solution Advisor (ESSA)	The Dell online advisor console enables easier and more meaningful estimates to help you determine the most efficient configuration possible. With Dell's, you can calculate the power consumption of your hardware, power infrastructure, and storage.	Dell.com/ESSA
Power and cooling technologies	Provides details for improving energy efficiency in the data center.	Dell.com/PNC
Energy management	Provides information on Dell's Fresh Air solutions.	Dell.com/FreshAir
Operating system matrix for Dell PowerEdge systems	Provides updated information on which operating systems are available on which PowerEdge systems.	Dell.com/OSsupport
Processor and chipset	Provides more information about the R620 processors and chipset.	Intel.com
Dell PowerEdge RAID controllers	Provides more information on Dell PowerEdge RAID controllers (PERC).	Dell.com/PERC
Power distribution unit (PDU)	Provides help selecting a power distribution unit (PDU).	DellPDU.com
Uninterruptible power supply (UPS)	Provides help selecting an uninterruptible power supply (UPS) model.	DellUPS.com
Volatility information	Contact your Dell Sales Representative.	